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IASST deploys deep learning network for breast cancer prognosis

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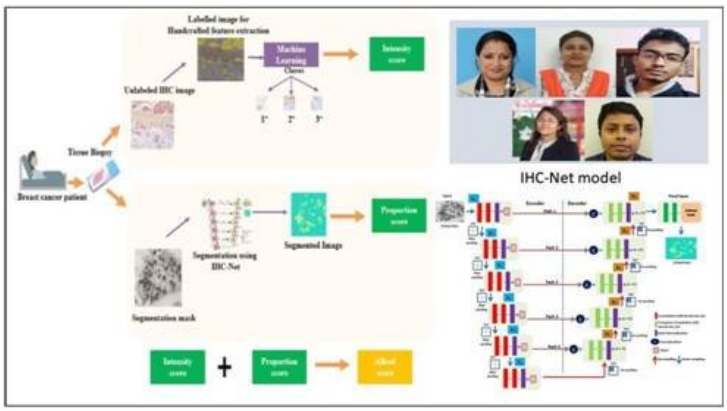

A team from the Institute of Advanced Study in Science and Technology (IASST) in Guwahati, an autonomous institute of the Department of Science & Technology, Govt of India, has presented the novel deep learning (DL) based quantitative evaluation of oestrogen or progesterone status with the help of Immunohistochemistry (IHC) specimen to grade for prediction of breast cancer.

The scientists developed a classification method based on deep learning (DL) network to evaluate hormone status for prognosis of breast cancer.

The study by Dr Lipi B Mahanta and her group was done in collaboration with clinicians of B Borooah Cancer Institute, the premier cancer institute of the region. With an enormous prospect for converting to a workable commercial software, this work has been accepted for publication in the pioneer journal Applied Soft Computing.

IHC strain is used as a prognostic marker in breast cancer pathology and involves a special kind of colour staining for identifying malignant nuclei. It possesses different intensity based on which categories are defined in terms of Allred score (ranges 0 to 3) respectively. Scoring systems called Allred and H-score are used by pathologists in the quantification of the immunohistochemical reaction of oestrogen receptor (ER) and progesterone receptor (PR) tissue slides. Hormone receptors, namely oestrogen receptor (ER) and progesterone receptor (PR) contribute to predicting cancer progression and associated risk of late recurrence of the disease.

The team developed an algorithm that indicated whether or not the cancer cells have hormone receptors on their surface. The proposed architecture, namely IHC-Net, can semantically segment the exact positive and negative nuclei from tissue images. Finally, an ensemble method is used, which integrates the decision of three machine learning (ML) models for the final Allred cancer score.